Volunteer Lake Assessment Program Individual Lake Reports

CONTOOCOOK LAKE, JAFFREY, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	5,888	**Max. Depth (m):**	7.1	**Flushing Rate (yr^{1})**	6.8
Surface Area (Ac.):	380	**Mean Depth (m):**	2.2	**P Retention Coef:**	0.5
Shore Length (m):	11,700	**Volume (m^{3}):**	1,944,000	**Elevation (ft):**	1009

TROPHIC CLASSIFICATION

Year	Trophic class
1988	MESOTROPHIC
2006	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

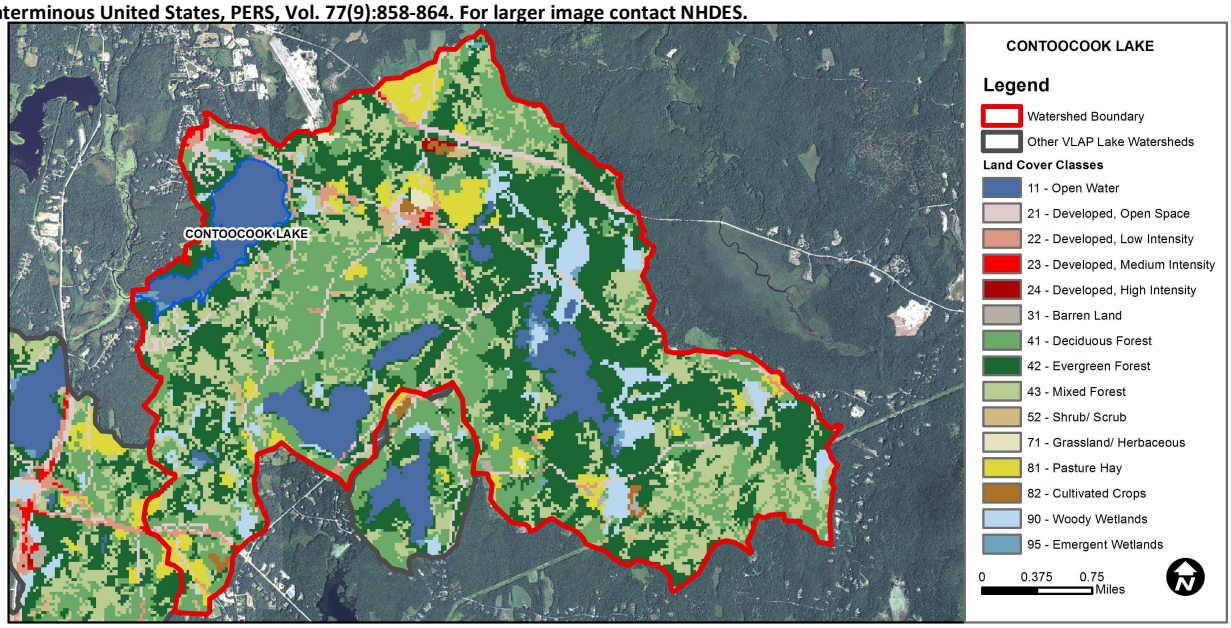
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	<5 samples and median is > threshold. More data needed.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

CONTOOCOOK LAKE - TOWN BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	9.12	Barren Land	0.18	Grassland/Herbaceous	0.34
Developed-Open Space	4.21	Deciduous Forest	21.28	Pasture Hay	4.42
Developed-Low Intensity	1.33	Evergreen Forest	32.86	Cultivated Crops	0.41
Developed-Medium Intensity	0.16	Mixed Forest	19.15	Woody Wetlands	5.37
Developed-High Intensity	0.08	Shrub-Scrub	0.65	Emergent Wetlands	0.48

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
CONTOOCOOK LAKE, JAFFREY, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels decreased from June to July and increased in August. It was unusual that field data note a lake wide algal bloom in July; however chlorophyll levels were very low. Epilimnetic phosphorus levels were elevated and support the observations of an algal bloom. The chlorophyll sample may have leaked during transport or the type of algae was small enough to pass through the filtering apparatus. Historical trend analysis indicates a significantly decreasing (improving) chlorophyll level since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Conductivity and chloride levels were elevated in Cochrane Inlet East, Squantum Inlet, Taft Inlet, and Woodbound Inlet. Conductivity and chloride levels at all other stations were slightly greater than the state median; except for Walsh Inlet and Below Airport which were less than or approximately equal to the state median. Historical trend analysis indicates stable epilimnetic conductivity with low variability between years.
- **E. COLI:** E. coli levels were well below the state standard for surface waters on each sampling event.
- **TOTAL PHOSPHORUS:** Phosphorus levels in Squantum Inlet and Below Airport were elevated, both likely from wetland influences. Phosphorus levels at all other stations were low in June and increased slightly in July and August likely due to lower tributary flows; however all were within low to average ranges. Epilimnetic phosphorus was elevated in July during a lake wide algal bloom as noted in field data. The algal cells contain phosphorus, necessary for growth, and the excess algae likely contributed to elevated phosphorus. Hypolimnetic phosphorus was average for the lake. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years.
- **TRANSPARENCY:** Transparency was lower in 2013 likely due to a combination of stormwater runoff and algal growth. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **TURBIDITY:** Turbidity was elevated in Cochrane Inlet East in August, Below Airport in July and August, and in Woodbound Inlet in June. Turbidity at all other tributary stations was relatively low. Epilimnetic turbidity was low throughout the summer despite an algal bloom in July. Hypolimnetic turbidity was elevated in July potentially due to a layer of algae at that depth.
- **PH:** Average pH levels at all stations except Woodbound Inlet were lower than desirable and potentially critical to aquatic life.
- **RECOMMENDED ACTIONS:** Tributary phosphorus and turbidity levels were low in June despite the above average rainfall and stormwater runoff. However, the significant June storm events and subsequent high water levels likely contributed to the algal bloom in July. Educate lake residents on ways to reduce stormwater runoff from their properties utilizing DES' "Homeowner's Guide to Stormwater Management". This reference was designed to assist watershed residents with the design and building of best management practices to capture, infiltrate and reduce stormwater runoff into tributaries and the lake. Conductivity and chloride levels are particularly elevated at stations located along local salted roadways. Encourage local road agents to obtain a Voluntary NH Salt Applicator license through the UNH Technology Transfer Center's (T2) Green SnowPro Certification Program. Keep up the great work!

Table 1. 2013 Average Water Quality Data for CONTOOCOOK LAKE

Station	Alk.	Chlor-a	Chloride	Cond.	E. Coli	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	#/100ml	ug/l	m		ntu	
							NVS	VS		
Below Airport			7	44.1	20	84			2.30	6.01
Cochrane Inlet E			37	150.4		11			6.93	5.78
Cochrane Inlet W			22	90.9		10			0.48	4.74
Dam Outlet				82.4		10			0.58	5.67
Epilimnion	3.07	4.11	13	68.3		23	2.22	2.50	0.73	6.35
Hypolimnion				68.8		14			1.46	6.23
Jowder Cove Inlet			20	86.6		12			0.45	6.16
Squantum Inlet			42	189.7	10	67			0.61	6.26
Taft Inlet			67	298.5		19			0.65	6.35
Townline Inlet			12	63.9	37	10			0.72	6.35
Walsh Inlet			3	28.9	40	14			0.72	6.43
Woodbound Inlet			28	144.1		15			2.43	6.91

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Degrading	Data significantly decreasing.	Chlorophyll-a	Improving	Data significantly decreasing
Conductivity	Stable	Trend not significant; data show low variability.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.